

Notice of Allowance dated 09/07/2006

Appl. No. 10/529,796

Amdt. dated 09/20/2006

Attorney Docket No. 1217-050937

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application. Claim 10 is amended herein.

Listing of Claims:

1. (Original) An apparatus for identifying a liquid type of a gasoline, comprising:

a gasoline liquid type identifying chamber for causing an identified gasoline introduced into a liquid type identifying apparatus body to stay temporarily;

a liquid type identifying sensor heater provided in the gasoline liquid type identifying chamber; and

a liquid temperature sensor provided in the gasoline liquid type identifying chamber apart from the liquid type identifying sensor heater at a constant interval;

the liquid type identifying sensor heater including a heater and an identifying liquid temperature sensor provided in the vicinity of the heater,

the apparatus further comprising an identification control portion for applying a pulse voltage to the liquid type identifying sensor heater for a predetermined time, heating the identified gasoline staying temporarily in the gasoline liquid type identifying chamber by the heater and identifying the liquid type with a voltage output difference V_0 corresponding to a temperature difference between an initial temperature and a peak temperature in the identifying liquid temperature sensor, and

an alcohol content detecting chamber,

the alcohol content detecting chamber being provided with an alcohol concentration detecting device in which an alcohol concentration in the gasoline is detected by introducing a gasoline between electrodes of an alcohol concentration detecting sensor, and by measuring a change in a specific inductive capacity of the gasoline between the electrodes with an oscillation frequency, and

based on the alcohol concentration detected by the alcohol concentration detecting device, liquid type identification data in the identification control portion being corrected on the basis of alcohol concentration data which are prestored in the identification control portion, thereby identifying a liquid type.

Notice of Allowance dated 09/07/2006

Appl. No. 10/529,796

Amdt. dated 09/20/2006

Attorney Docket No. 1217-050937

2. (Original) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein the voltage output difference V_0 is equal to a voltage difference between an average initial voltage V_1 obtained by sampling an initial voltage before application of the pulse voltage at a predetermined number of times and an average peak voltage V_2 obtained by sampling a peak voltage after the application of the pulse voltage at a predetermined number of times, that is,

$$V_0 = V_2 - V_1.$$

3. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein in accordance with calibration curve data to be a correlation of a voltage output difference with a temperature for a predetermined reference gasoline prestored in the identification control portion, the identification control portion is constituted to identify a type of a gasoline with the voltage output difference V_0 obtained for the identified gasoline.

4. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein the identification control portion is constituted to correlate a liquid type voltage output V_{out} for the voltage output difference V_0 at a measuring temperature of the identified gasoline with an output voltage for a voltage output difference at a measuring temperature for a predetermined threshold reference gasoline and to thus carry out a correction.

5. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein the liquid type identifying sensor heater is a laminated liquid type identifying sensor heater in which a heater and an identifying liquid temperature sensor are laminated through an insulating layer.

6. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein the heater and the identifying liquid temperature sensor in the liquid type identifying sensor heater are constituted to come in contact with the identified gasoline through a metallic fin, respectively.

Notice of Allowance dated 09/07/2006

Appl. No. 10/529,796

Am dt. dated 09/20/2006

Attorney Docket No. 1217-050937

7. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein the liquid temperature sensor is constituted to come in contact with the identified gasoline through the metallic fin.

8. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein the alcohol concentration detecting sensor comprises an alcohol concentration detecting sensor body including a base material resin film, an electrode wiring pattern formed on the base material resin film, and an insulating resin covering a surface of the electrode wiring pattern.

9. (Original) The apparatus for identifying a liquid type of a gasoline according to claim 8, wherein the alcohol concentration detecting sensor body is stuck onto a substrate.

10. (Currently Amended) The apparatus for identifying a liquid type of a gasoline according to claim 8, wherein the electrode wiring pattern is obtained by selectively etching a conductive metallic foil laminated on one of surfaces of the base material resin film, thereby forming a wiring pattern taking a predetermined predetermined shape.

11. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 1, wherein the alcohol concentration detecting sensor comprises a substrate, an electrode wiring pattern formed on the substrate, and an insulating coat covering a surface of the electrode wiring pattern.

12. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 11, wherein the electrode wiring pattern is obtained by selectively etching a conductive metallic thin film formed on one of surfaces of the substrate by sputtering, thereby forming a wiring pattern taking a predetermined shape.

13. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 11, wherein the insulating coat is formed by chemical vapor deposition (CVD).

Notice of Allowance dated 09/07/2006

Appl. No. 10/529,796

Amdt. dated 09/20/2006

Attorney Docket No. 1217-050937

14. (Previously Presented) The apparatus for identifying a liquid type of a gasoline according to claim 8, wherein the electrode wiring pattern has such a shape that positive and negative electrodes which are comb-toothed are alternately intricate.

15. (Original) A method for identifying a liquid type of a gasoline, comprising the steps of:

applying a pulse voltage for a predetermined time to a liquid type identifying sensor heater including a heater and an identifying liquid temperature sensor provided in the vicinity of the heater; heating an identified gasoline by the heater; and identifying the liquid type with a voltage output difference V_0 corresponding to a temperature difference between an initial temperature and a peak temperature in the identifying liquid temperature sensor;

introducing a gasoline between electrodes of an alcohol concentration detecting sensor, and measuring a change in a specific inductive capacity of the gasoline between the electrodes with an oscillation frequency thereby detecting an alcohol concentration in the gasoline; and

wherein based on the alcohol concentration detected by the alcohol concentration detecting device, correcting liquid type identification data in the identification control portion on the basis of alcohol concentration data which are prestored in the identification control portion, thereby identifying a liquid type.

16. (Original) The method for identifying a liquid type of a gasoline according to claim 15, wherein the voltage output difference V_0 is equal to a voltage difference between an average initial voltage V_1 obtained by sampling an initial voltage before application of the pulse voltage at a predetermined number of times and an average peak voltage V_2 obtained by sampling a peak voltage after the application of the pulse voltage at a predetermined number of times, that is,

$$V_0 = V_2 - V_1.$$

17. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 15, wherein in accordance with calibration curve data to be a correlation of a voltage output difference with a temperature for a predetermined reference gasoline which is prestored, a type of a gasoline is identified with the voltage output difference V_0 obtained for the identified gasoline.

Notice of Allowance dated 09/07/2006

Appl. No. 10/529,796

Amdt. dated 09/20/2006

Attorney Docket No. 1217-050937

18. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 15, wherein a liquid type voltage output V_{out} for the voltage output difference V_0 at a measuring temperature of the identified gasoline is correlated with an output voltage for a voltage output difference at a measuring temperature for a predetermined threshold reference gasoline and is thus corrected.

19. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 15, wherein the liquid type identifying sensor heater is a laminated liquid type identifying sensor heater in which a heater and an identifying liquid temperature sensor are laminated through an insulating layer.

20. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 15, wherein the heater and the identifying liquid temperature sensor in the liquid type identifying sensor heater are constituted to come in contact with the identified gasoline through a metallic fin, respectively.

21. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 15, wherein the liquid temperature sensor is constituted to come in contact with the identified gasoline through the metallic fin.

22. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 15, wherein the alcohol concentration detecting sensor comprises an alcohol concentration detecting sensor body including a base material resin film, an electrode wiring pattern formed on the base material resin film, and an insulating resin covering a surface of the electrode wiring pattern.

23. (Original) The method for identifying a liquid type of a gasoline according to claim 22, wherein the alcohol concentration detecting sensor body is stuck onto a substrate.

24. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 22, wherein the electrode wiring pattern is obtained by selectively etching a conductive metallic foil laminated on one of surfaces of the base material resin film, thereby forming a wiring pattern taking a predetermined shape.

Notice of Allowance dated 09/07/2006

Appl. No. 10/529,796

Amdt. dated 09/20/2006

Attorney Docket No. 1217-050937

25. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 15, wherein the alcohol concentration detecting sensor comprises a substrate, an electrode wiring pattern formed on the substrate, and an insulating coat covering a surface of the electrode wiring pattern.

26. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 25, wherein the electrode wiring pattern is obtained by selectively etching a conductive metallic thin film formed on one of surfaces of the substrate by sputtering, thereby forming a wiring pattern taking a predetermined shape.

27. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 25, wherein the insulating coat is formed by chemical vapor deposition (CVD).

28. (Previously Presented) The method for identifying a liquid type of a gasoline according to claim 22, wherein the electrode wiring pattern has such a shape that positive and negative electrodes which are comb-toothed are alternately intricate.

29. (Previously Presented) An apparatus for identifying a liquid type of a gasoline of a car,

wherein the apparatus for identifying a liquid type of a gasoline according to claim 1 is provided in a gasoline tank or on an upstream side or a downstream side of a gasoline pump.

30. (Previously Presented) A method for identifying a liquid type of a gasoline of a car, comprising the step of:

identifying a type of a gasoline in a gasoline tank or on an upstream side or a downstream side of a gasoline pump by using the method for identifying a liquid type of a gasoline according to claim 15.

31. (Previously Presented) An apparatus for reducing an exhaust gas of a car, comprising:

Notice of Allowance dated 09/07/2006

Appl. No. 10/529,796

Amdt. dated 09/20/2006

Attorney Docket No. 1217-050937

the apparatus for identifying a liquid type of a gasoline according to claim 1 which is provided in a gasoline tank or on an upstream side or a downstream side of a gasoline pump; and

an ignition timing control device for regulating an ignition timing based on the type of the gasoline which is identified by the apparatus for identifying a liquid type of a gasoline.

32. (Previously Presented) A method for reducing an exhaust gas of a car, comprising the steps of:

identifying a type of a gasoline in a gasoline tank or on an upstream side or a downstream side of a gasoline pump by using the method for identifying a liquid type of a gasoline according to claim 15; and

regulating an ignition timing based on the type of the gasoline which is identified by the apparatus for identifying a liquid type of a gasoline.

33. (Previously Presented) An apparatus for reducing an exhaust gas of a car, comprising:

the apparatus for identifying a liquid type of a gasoline according to claim 1 which is provided in a gasoline tank or on an upstream side or a downstream side of a gasoline pump; and

a gasoline compression control device for regulating a compressibility of the gasoline based on the type of the gasoline which is identified by the apparatus for identifying a liquid type of a gasoline.

34. (Previously Presented) A method for reducing an exhaust gas of a car, comprising the steps of:

identifying a type of a gasoline in a gasoline tank or on an upstream side or a downstream side of a gasoline pump by using the method for identifying a liquid type of a gasoline according to claim 15; and

regulating a compressibility of the gasoline based on the type of the gasoline which is identified by the apparatus for identifying a liquid type of a gasoline.